JEE MAIN QUESTION PAPER 27 JANUARY 2024

MATHEMATICS:

1. $x^2/25 + y^2/16 = 1$ is the given ellipse. Find the length of the chord whose midpoint is (1/2, 2/5).

Answer. $(7\sqrt{41})/5$

2. Find p if:
$3 + (3 + p)/4 + (3 + 2p)/4^2 + ...\infty = 8$

Answer. P=9

3. If a line L = 4x + 5y = 20 trisects two other lines L_1 and L_2 that pass through the origin, then find the tangent made by the line L.

Answer. 8/5 & 2/5

4. $a = \lim\limits_{x \to \infty} \left(\dfrac{\sqrt{1+\sqrt{1+x^2}} - \sqrt{2}}{x^4} \right)$ and $b = \lim\limits_{x \to \infty} \left(\dfrac{sin^2 x}{\sqrt{2} - \sqrt{1+cosx}} \right)$, then find ab^3.

Answer: $ab^3 = 32$

5. The vertices of a triangle ABC are A(1,2), B(- 3, 4) and C(5,8), then the orthocentre of ∆ABC is?

Answer. (3/2):1

6. S_1 = 3,9,15, … 25 terms and S_2 = 3,8,13, … 37 terms, then the number of common terms in S_1, S_2 is equal to?

Answer. 5

7. The value of k for (2k, 3k), (0, 0), (1,0) and (0,1) to be on the circle is:

Answer. 5/13

8. $\int_0^1 \dfrac{1}{\sqrt{3+x} + \sqrt{1+x}} dx = a + b\sqrt{2} + c\sqrt{3}$, then $2a - 3b - 4c = ?$

Answer: 12

If $f(x) - f(y) = \ln\left(\dfrac{x}{y}\right) + x - y$, then find $\sum_{k=1}^{20} f'\left(\dfrac{1}{k^2}\right)$

Answer: 2890